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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/596,825

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Takeaki Itsuji

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EXAMINER

RAMDHANIE, BOBBY

ART UNIT

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MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/596,825	Applicant(s) ITSUJI ET AL.	
	Examiner BOBBY RAMDHANIE	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-14 is/are pending in the application.
- 4a) Of the above claim(s) 8 and 9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-7 and 10-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/26/2009 has been entered.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the array which shows a plurality of the sensor set forth in Claim 1 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. Claim 1 recites a sensor with its own respective waveguide, detecting portion, and, protrusions. Claim 1 is interpreted to have these limitations.

4. The Drawings do not show an array with a plurality of sensors, each with its own separate waveguide, detection portion, and protrusions. In addition, the inkjet system is not disclosed in the Drawings.

5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

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prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Response to Arguments

6. Applicant's arguments with respect to claims 1, 2, 6, 7, & 10-14 have been considered but are moot in view of the new ground(s) of rejection. The new grounds of rejection are necessitated by Applicant's amendments to the Claims.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1, 5-7, & 10, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagel et al (Appl. Phys. Lett. 2002) in view of either Nagel et al (Biological and Medical Applications (Conference Digest of The 2004, Joint 24th International Conference; September 27th, 2004) or Negami et al (JP2001-074647).

10. Applicant's claims are toward a device.

11. Regarding Claims 1, 5-7, & 10, Nagel et al (2002) discloses the sensor comprising: a waveguide comprising: A). A single conductor for allowing an electromagnetic wave to propagate therethrough and allowing an object to be disposed at a plurality of positions thereof (See Figure 1 TMFS); B). A detecting portion for detecting the electromagnetic wave which has interacted with the object at the plurality of positions and propagated through the waveguide (See Page 155, probe tip). Nagel et al (2002) does not disclose protrusions comprising a dielectric for disposing the object at the plurality of positions, the protrusions being periodically disposed at intervals of an order of a wavelength of the electromagnetic wave such that the object and the electromagnetic wave propagating through the waveguide interact with each other,

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wherein a property of the object is analyzed or identified based on information obtained from the electromagnetic wave detected by the detecting portion.

12. Nagel et al (2004) discloses sensor comprises a pp waveguide that further comprises a single (infinite TMFS - Figure 1 Au film) which upon it is a dielectric layer for disposing the object at the plurality of positions, the protrusions being periodically disposed at intervals of an order of a wavelength of the electromagnetic wave such that the object and the electromagnetic wave propagating through the waveguide interact with each other, wherein a property of the object is analyzed or identified based on information obtained from the electromagnetic wave detected by the detecting portion (See Figure 1 PET layer).

13. Negami et al discloses a sensor which comprises a waveguide comprising a single conductor (See Figure 3a; Item 6; metal film) and a sensor which also comprises protrusions comprising a dielectric for disposing the object at the plurality of positions, the protrusions being periodically disposed at intervals of an order of a wavelength of the electromagnetic wave such that the object and the electromagnetic wave propagating through the waveguide interact with each other, wherein a property of the object is analyzed or identified based on information obtained from the electromagnetic wave detected by the detecting portion (See Figure 3a Item 8; dielectric film & See Figure 3a in view of Drawing 7; the array).

14. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Nagel et al (2002) with Nagel et al (2004) or Negami et al because according to Nagel et al (2004) Mendis and Grischkowsky demonstrated the

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outstanding low-loss and low dispersion THz-transmission behavior of parallel waveguides shown an attenuation level of approximately one order of magnitude lower than for TFMS lines, which is a basic requirement for the fabrication of high-Q resonators. In principle a pp waveguide is nothing else than a TFMS line with infinite width and air as a dielectric (See Page 819; Left Column) and because according to Negami et al the use of the dielectric film allows the SPR sensor to be transformed into an immunological analyzer which would be consistent with Nagel et al's field of biochemistry analysis, which comprises both genetic diagnostics and immunological reactions. The recitation, "comprising a single conductor" does not limit the sensor to only have one single conductor in the whole sensor; note: "comprising" was used to recite this limitation instead of "consisting of.")

15. Additional Disclosures Included: Claim 5: A sensing apparatus having a plurality of the sensor set forth in claim 1 arranged in an array (See Negami et al; Figure 7); Claim 7: A sensing apparatus comprising: the sensor set forth in claim 1; and means for coupling the electromagnetic wave into the waveguide for allowing the electromagnetic wave to propagate therethrough (See Page 155, Left Column, 1st Paragraph); and Claim 10: The sensor according to claim 1, wherein the waveguide is a coplanar waveguide which comprises a dielectric having disposed on a surface thereof the single conductor and a ground conductor with a minute gap between the single conductor and the ground conductor, provided with a minute gap there between, and wherein the protrusions are disposed on the surface of the dielectric and have a

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structure in which the object is disposed in the minute gap at a pitch corresponding to a half of the wavelength of the electromagnetic wave (See Nagel et al, 2004; Figure 1);

16. Regarding Claim 6, the combination of Nagel et al (2002) with either Nagel et al (2004) or Negami et al disclose the sensor set forth in claim 1. The combination does not disclose a storage portion for storing information associated with the property of the object, wherein the information obtained by the detecting portion and the information stored in the storage portion are used to analyze or identify the property of the object.

17. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the sensing apparatus to have a storage portion for storing information associated with the property of the object, wherein the information obtained by the detecting portion and the information stored in the storage portion are used to analyze or identify the property of the object because Nagel et al discloses that the measured data is converted to the frequency domain by fast Fourier transformation to derive the frequency dependent transmission parameters (S_{21}) (See Page 155, Left Column. The measurements and calculations imply a storage portion for the data to be stored and analyzed), Nagel et al (2004) would essential need a storage portion for the Optoelectronic Characterization, and because Negami et al discloses that the sensor that is disclosed is for an immunological analyzer using optical fibers that was developed under the trade name: BIACORE, which essential has a storage portion which is capable of performing the intended function (See Negami et al; [0011]).

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18. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neuschafer et al.

19. Applicants' claims are toward a device.

20. Regarding Claims 11, 12, & 14, Neuschafer et al discloses the sensor (See Figure 6) comprising: A). A waveguide for allowing an electromagnetic wave of 30 GHz to 30 THz to propagate therethrough (See Figure 6 Item 8; waveguide platform which can be made from quartz; quartz is capable of allowing an electromagnetic wave of 30 GHz to 30 THz to propagate therethrough); B). Allowing a sensing object to be disposed thereon (See Column 12 lines 52-58; binding partners & Column 20 lines 25-35); C). A detecting portion for detecting the electromagnetic wave which has propagated through the waveguide (See Figure 6 Item 14; detection optics/electronics); D). An ink jet system for ejecting and disposing the object on the waveguide wherein the object is ejectable from the ink jet system (See Column 12 lines 52-58; multiple-pipette head and modified inkjet printing head); and E). Protrusions comprising a dielectric and disposed at a plurality of positions on the waveguide located at intervals such that the object and the electromagnetic wave propagating through the waveguide interact with each other (See Column 5 lines 15-22; a waveguide with gratings indicates protrusions & Column 6 lines 38-47 note the vast number of different geometric shapes and protrusions). Neuschafer et al does not explicitly disclose that the object is ejected toward the protrusions.

21. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of how the device is used to only eject the

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object only toward the protrusions because according to Neuschafer et al, a further advantage of the sensor platform is that the individual separate waveguiding regions can be selectively addressed optically, chemically, or fluidically (See Column 5 lines 46-50) and therefore prevent cross talk when different samples are analyzed simultaneously (See Column 5 lines 38-42).

22. Additional Disclosures Included: Claim 12: A sensor comprising: A). A waveguide which is a microstrip line comprising a single conductor for allowing an electromagnetic wave of 30 GHz to 30 THz to propagate therethrough (See Column 6 line 38-45; lines) and B). Allowing a sensing object to be disposed thereon (See Column 12 lines 52-58; binding partners & Column 20 lines 25-35); C). An object disposing means for disposing the object on the waveguide (See Column 5 lines 15-22; gratings); and wherein the object disposing means comprises a pattern including a hydrophilic portion and a hydrophobic portion, for disposing the object at a plurality of positions on the waveguide located at intervals such that the object and the electromagnetic wave propagating through the waveguide interact with each other (See Column 8 lines 38-46 & Column 9 lines 1-7); and D). A detecting portion for detecting the electromagnetic wave which has propagated through the waveguide (See Figure 6 Item 14); and Claim 14: The sensor comprising: A). A waveguide for allowing an electromagnetic wave of 30 GHz to 30 THz to propagate therethrough (See Figure 6 Item 8; waveguide platform which can be made from quartz; quartz is capable of allowing an electromagnetic wave of 30 GHz to 30 THz to propagate therethrough) and B). Allowing a sensing object to be disposed thereon a detecting portion for detecting the electromagnetic wave which has

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propagated through the waveguide (See Column 12 lines 52-58; binding partners & Column 20 lines 25-35), C). An ink jet system for ejecting and disposing the object; and holes disposed at a plurality of positions on the waveguide located at intervals such that the disposed object and the electromagnetic wave propagating through the waveguide interact with each other, wherein the object is ejectable from the ink jet system toward the holes (See Column 12 lines 52-58 & Column 5 lines 15-22; gratings have holes).

23. Regarding Claim 13, Neuschafer et al discloses the sensor apparatus for sensing an object by using a sensor and an information obtained from a detection portion constituting the sensor, which comprises: A) A sensor comprising a waveguide which is a microstrip line comprising a single conductor for allowing an electromagnetic wave of 30 GHz to 30 THz to propagate therethrough (See Column 9 lines 28-35) and B). Allowing a sensing object to be disposed thereon, an object disposed thereon to be sensed (See Column 12 lines 52-58; binding partners & Column 20 lines 25-35); and D). A detecting portion for detecting the electromagnetic wave which has propagated through the waveguide (See Figure 6 Item 14); E). An ink jet system for disposing the object at a plurality of positions on the waveguide located at intervals such that the object and the electromagnetic wave propagating through the waveguide interact with each other (See Column 12 lines 52-58; multiple-pipette head and modified inkjet printing head).

24. Neuschafer et al does not disclose F). A storage portion for storing information associated with a property of the object, wherein information obtained by the detecting

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portion and the information stored in the storage portion are used to analyze or identify the property of the object.

25. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the sensing apparatus to have a storage portion for storing information associated with the property of the object, wherein the information obtained by the detecting portion and the information stored in the storage portion are used to analyze or identify the property of the object because Neuschafer et al discloses that the present invention relates also to the use of the sensor platform or modifies sensor platform according to the invention for the quantitative of biochemical substances in affinity sensing which would essentially need a storage portion to record the spectral data such as the Raman emissions and short lived luminescence measurements from the samples.

Telephonic Inquiries

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BOBBY RAMDHANIE whose telephone number is (571)270-3240. The examiner can normally be reached on Mon-Fri 8-5 (Alt Fri off).

27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. R./

/Walter D. Griffin/
Supervisory Patent Examiner, Art Unit 1797